

REMARKS

Reconsideration of the Final Office Action of October 1, 2008 is respectfully requested and entry of the present amendments for purposes of placing the application in immediate condition for allowance or in better condition for appeal is respectfully requested.

Accompanying this Amendment is a two month extension of time with requisite fee.

Enclosed herewith is an Information Disclosure Statement with requisite fee and a certification that the references were only recently located by the undersigned.

Applicants would like to thank Supervisor Tran and Examiner Mancho for the courtesies extended to Applicants' representatives in the interview held on February 4, 2009. The discussion below references some of that discussion where applicable.

As an initial matter, in the present application there is pending claims 1-3, 5-7, 9-11, 26, 29, 31, 32 and 34-37. In the cover sheet of the last Amendment, claim 37 was not referenced as a pending claim. In the main body of the Office Action there is reference to claim 37 as being not considered on the basis of its withdrawn status. Applicants respectfully request confirmation in the next Action that claim 37 is recognized as a pending claim (although deemed withdrawn). Based on the discussion during the interview and below, claim 37 is respectfully submitted to have allowable features in similar fashion to current independent claims 1 and 36.

To summarize the claim changes made in this Amendment, claims 1, 3, 29, 34 and 35 have been amended. No new matter is considered to be introduced by these amendments.

Claim Rejections - 35 U.S.C. §112, first paragraph

Claims 2, 3, 34 and 35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. As described during the interview, it is respectfully submitted that there is enabling support for each of the features referenced in the Office Action such that each of claims 2, 3, 34 and 35 fully satisfies the requirements of 35 USC 112, first paragraph. To review and facilitate an understanding as to how the original application is considered fully enabling, provided below is a table with a discussion of how the original disclosure would be deemed by one of ordinary skill in the art to be enabling.

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| “sliding mode control” | As discussed in the interview, this phraseology is considered to be enabled as it is disclosed in detail as in the discussion on pages 34 to 38 and the discussion associated with equations 17, 20, 23 and 26. Further, as seen by, for example, the Continuously Variable Transmission (CVT) US Pat. No. 5,993,338 to Kato et al, terminology concerning the use of a sliding mode control with a switch back function is utilized in other areas such as in the CVT patent referenced. Reference is also made to the additional “sliding mode” references cited in the Information Disclosure Statement being filed concurrently and the discussion associated with “polarity” below. |
| “switching function” | See above and also below discussion of “switching function”. |
| “at least a polarity related to an integral term of deviation” | This polarity term is explained on pages 39 and 40 of present application. Claim 2 has not been amended as the term “deviation” (which was discussed in the Examiner Interview) has direct support in claim 1. That is, “the deviation” refers back to “ <u>a deviation</u> ” in claim 1. Reference is also made below to the <u>example</u> of this terminology. |
| “first clutch torque computing unit” | As but one example of enabling disclosure support – reference is made in the original application to the discussion as to Tlsdfb determination such as that described on pages 44 and 48 and the disclosure relative to equation 33 (e.g., the feedback control clutch torque as computed by the “feedback control clutch torque computing and outputting unit”52i) – As the formulas and description of the present application explain in detail how to obtain the first clutch torque, computing unit (e.g., 52i) is respectfully submitted to be enabled and not merely an empty “black box” -- |

With reference to the “polarity” discussion above, provided below is an example of the disclosure’s description of what this “polarity” language includes.

In claim 2, there is referenced the following:

switching function using at least a polarity related to an integral term of the deviation.

(A) For an example of the claim terminology “the deviation”, reference is made to the equations (13)-(16) (e.g., ectrf);

(B) Also, for an example of the An integral term of the deviation, reference is made to equations (19)(22)(25)(28), e.g.,

$$s \text{ ctrf} = \epsilon \text{ ctrf} + k_i \int (\epsilon \text{ ctrf}) dt \quad \dots (19)$$

with $\epsilon \text{ ctrf}$ representing, in this example, the differential speed deviation between the front and rear axles;

(C) the “integral term” phrase in the claim includes:

(I) $\int (\epsilon \text{ ctrf}) dt$ or

(II) $s \text{ ctrf}$;

(D) Further, for the terminology, “a polarity related to an integral term” reference is made to equations (18)(21)(24)(27); e.g.,

$$x \text{ ctrf} = k_w \text{ ctrf} + J_w \bullet (d \epsilon \text{ ctrf} / dt) + T_{sg} \bullet (s \text{ ctrf} / (|s \text{ ctrf}| + \delta)) \quad \dots (18);$$

(E) In equation (18), the term “ $(s \text{ ctrf} / (|s \text{ ctrf}| + \delta))$ ” represents “the polarity”. For the terminology “switching function” reference is made to equation (17)(20)(23)(26); e.g.,

$$T_{SMC} \text{ ctrf} = \text{sat} (x \text{ ctrf}) = \begin{cases} 0 & (x \text{ ctrf} \leq 0) \\ x \text{ ctrf} & (x \text{ ctrf} > 0) \end{cases}$$

Accordingly, it is submitted that the original application is fully enabling relative to each of the above-noted terms referenced in the 35 U.S.C. 112 rejection. With further reference to claims 3, 34 and 35, as discussed in the interview, it is submitted that the noted language in these claims is also fully enabling. As an example of one of the various possible techniques that might be utilized under the present invention, reference is made to the exemplary formula and associated discussion on page 49 – which formula appears as follows:

$$T_{lsd} = R_{tr} T_{lsdff} + (1 - R_{tr}) T_{lsdfb}$$

Reference is further made to Figure 6 which provides an illustration of a tire diameter difference coefficient value (e.g., R_{tr}) and its relationship to tire diameter differences for that embodiment. As seen, in the illustrated exemplary embodiment, as the tire diameter difference gets larger, the R_{tr} value drops in the noted equation. Hence, again as but one illustrative embodiment, the feed forward portion of the equation segment ($R_{tr} \cdot T_{lsdff}$) in the equation above is given less weight relative to the calculation of the final torque as the R_{tr} value gets lower (and

the tire difference coefficient gets larger). For example, with reference again to the above formula for ease of illustration, if R_{tr} drops from the illustrated .5 higher level to .1, the equation weight of the feedback portion $(1 - R_{tr}) T_{lsd_{fb}}$ ("FB") is relatively larger than the weight of the feedforward $(T_{lsd_{ff}})$ ("FF") portion. That is, $[.1 (T_{lsd_{ff}}) + .9 (T_{lsd_{fb}})]$. Thus, if an operator rapidly depresses an accelerator (which in an exemplary embodiment is utilized in determining the feedforward valuation), under the above example, the normally large influence on the FF side of the equation is lessened to avoid an undesired high lock up level for a tire scenario in which there is a relatively large different in tire diameter, as in a mounted spare tire. Accordingly, it is respectfully submitted that the general disclosure in the original application, including the exemplary embodiments such as the above illustrative example, results in the claim language being both enabled and sufficiently described as to satisfy the written description and enablement requirements under 35 USC 112, first paragraph. Reference is also made to the discussion in the previously filed amendment with additional references made to the manner in which the above noted claims 3, 34 and 35 are submitted to satisfy all requirements of 35 USC 112, first paragraph. Further, it is submitted that the present claim wording in each of the above noted claims is definite and in full compliance with 35 USC 112, second paragraph.

Thus, it is respectfully submitted that claims 3, 34 and 35 comply with all requirements of 35 U.S.C. 112.

Claim Rejection - 35 U.S.C. §103

Claims 1-3, 5-7, 9-11, 26, 29, 31, 32, 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al (US 2002/0005077) in view of Drexel (US 6,040,768). Further, claim 36 is rejected under 35 U.S.C. 103 based on the combination above and in further view of Matsuno.

Applicants respectfully submit that neither of the above asserted obviousness combinations presents a *prima facie* case of obviousness.

For example, none of the prior art has a computation unit that uses a tire diameter different coefficient value in determining a torque value output (Matsuno even teaches away from such a use by indicating that when a tire diameter difference is present there should be avoided the use of the correction value utilized relative to the torque determination).

That is, as recognized in the Office Action, the base reference to Ozaki fails to disclose or suggest in any fashion the utilization of a tire diameter difference value in association with a first and second control units for computing the noted first and second clutch torques as set out in claim 1.

Nor does the secondary reference to Drex1 remedy this deficiency in Ozaki. That is, there is no disclosure or suggestion in Drex1 of computing a tire diameter difference reference value and then utilization of the same in the torque computing unit featured in claim 1. Rather, in Drex1 the goal is to be able to use preexisting sensors as in vehicle speed and factory set values such as the gear ratio and the tire diameter to work backwards down the transmission line (e.g., wheel rotation rate – wheel axle rotation rate – set gear differential ratio to get to the rotation rate of the clutch output shaft connected to that differential). Thus, this “backwards” determined value of clutch output shaft rotation can then be compared with the input rotation side (based on an engine speed sensor) and a determination made as to whether there is full engagement or not of the clutch.

The lack of a discussion of using a tire diameter coefficient value in the above-described context for independent claim 1 appears to be recognized in the introduction in the Office Action of Matsuno in the rejection of claim 36. However, as noted above Matsuno actually teaches away from the utilization or introduction of a tire diameter difference feature in the context of torque computation. In this regard, reference is made to Matsuno col. 12, lines 8-15 which read as follows:

“If it is judged at step S206 that the tires of the different diameters are not attached, the control is passed to step S207. In contrast, if it is judged at step S206 that the tires of the different diameters are attached, the wheel speeds are different from those attained with normal operations. The correction cannot be carried out correctly. The correction coefficient will therefore not be corrected, but the routine terminates.”

Independent Claim 37

Independent claim 37 was withdrawn in the previous Office Action. A review of claim 37 reveals, however, that it shares some similarity with dependent claims which were previously presented and considered prior to the filing of an RCE in this case. For instance, the formula on

page 49 provides an illustration of one suitable embodiment wherein the feedback and feedforward based clutch control values are weighted in association with tire diameter differences. Accordingly, it is respectfully submitted that the prior search and claim consideration for those dependent claims, like those discussed above, establishes that claim 37 is also in immediate condition for allowance.

Thus, Applicants respectfully submit that independent claims 1, 36 and 37 and their dependent claims are patentably distinguishable over Ozaki, Drexel and Matsuno, and the application as a whole stands in condition for allowance.

If for any reason (as in a remaining formality issue) a telephone call will expedite prosecution, the Examiner is invited to telephone the undersigned.

Also, if any fees are due in connection with the filing of this amendment, such as fees under 37 C.F.R. §§1.16 or 1.17, please charge the fees to Deposit Account 02-4300; Order No.032405R156.

Respectfully submitted,

SMITH, GAMBRELL & RUSSELL, LLP



Dennis C. Rodgers, Reg. No. 32,936
1130 Connecticut Avenue, N.W., Suite 1130
Washington, DC 20036
Telephone : 202/263-4300
Facsimile : 202/263-4329

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